From:	Ferreira, Gina
To:	Ferreira, Steve
Subject:	FW: HATCO - NJDEP Technical Consultation Meeting Summary
Date:	Monday, February 10, 2020 12:25:40 PM
Attachments:	image001.png image002.png 2003-07-11 RIWP.pdf 2019-06-27 Hatco-NJDEP TechMemo - Revised.pdf

FYI – More Hatco information from NJDEP

From: Hamill, Nancy <Nancy.Hamill@dep.nj.gov>
Sent: Monday, February 10, 2020 10:40 AM
To: Ferreira, Gina <Ferreira.Gina@epa.gov>
Subject: FW: HATCO - NJDEP Technical Consultation Meeting Summary
Gina, you may have this, but just in case, this is the most recent communication I've had with the LSRP…it's a summary of the most recent technical consultation/meeting, May 30, 2019.

From: Mark Fisher <MFisher@elminc.com>
Sent: Thursday, June 27, 2019 11:56 AM
To: Hamill, Nancy <Nancy.Hamill@dep.nj.gov>
Cc: Motter, Allan <Allan.Motter@dep.nj.gov>; Schindler, Jason <Jason.Schindler@WestonSolutions.com>; McGahan, Andrea <Andrea.McGahan@WestonSolutions.com>; Soukup, James <Jim.Soukup@WestonSolutions.com>
Subject: [EXTERNAL] RE: NJDEP Technical Consultation Meeting Summary
Hi Nancy – the requested revision has been made to the summary memo (attached).
Regarding the PCB item, the concentration is correct. Attached please find the Sovereign report which provided the PCB concentration of 150,000 ppm (page 34 of the attached PDF, bullet item #1).

Let us know if you have any further questions/comments. Have safe and happy 4th! Thanks, Mark

From: Hamill, Nancy <Nancy.Hamill@dep.nj.gov>
Sent: Tuesday, June 25, 2019 10:11 AM
To: Mark Fisher <MFisher@elminc.com>
Cc: Motter, Allan <Allan.Motter@dep.nj.gov>
Subject: RE: NJDEP Technical Consultation Meeting Summary
Hi Mark,
Allan and I conferred, and we have one question and one edit request:
10. Our meeting notes don't reflect a specific concentration of 150,000 mg/kg PCBs on the EPEC property. It might be an oversight on our part, but we ask that you verify this concentration and the units.
13. Penultimate sentence: "NJDEP is now stressing the use of one set of NOAEL and LOAEL Toxicity Reference Values (TRVs) for each contaminant-receptor pair."
I'll wait to hear back from you before posting this in NJEMS.
Thank you.

Nancy E. Hamill
Research Scientist
Bureau of Environmental Evaluation and Risk Assessment
Mailcode: 401-05W
P.O. Box 420
Trenton, NJ 08625
Phone: 609-633-1353

From: Mark Fisher <MFisher@elminc.com>
Sent: Monday, June 24, 2019 10:20 AM
To: Hamill, Nancy <Nancy.Hamill@dep.nj.gov>; Haklar, James <Haklar.James@epa.gov>; Conetta.Benny@epa.gov; Robles.Sadira@epa.gov; Ferreira, Gina <Ferreira.Gina@epa.gov>; Motter, Allan <Allan.Motter@dep.nj.gov>
Cc: Schindler, Jason <Jason.Schindler@WestonSolutions.com>; Jim.Soukop@westonsolutions.com; andrea.megahan@westonsolutins.com
Subject: [EXTERNAL] NJDEP Technical Consultation Meeting Summary
Hi Nancy – attached is a summary from our recent Technical Consultation Meeting regarding the Hatco Site. Please let us know if you have any questions. Thanks again to all involved at NJDEP and USEPA for making the time to meet with our team. Regards, Mark

THE ELM GROUP

MARK D. FISHER, CHMM, LSRP
Managing Partner
The ELM Group, Inc.
345 Wall Street | Research Park | Princeton | NJ 08540
Tel 609.683.4848 Ext.222 | **Cell** 609.577.3974
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30th ANNIVERSARY

THE ELM GROUP

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WWW.EXPLOREELM.COM

MEMORANDUM

TO: Allan Motter, Technical Coordinator
Nancy Hamill, Technical Coordinator
NJDEP - Bureau of Environmental Evaluation and Risk Assessment

FROM: Mark D. Fisher, CHMM, LSRP
The ELM Group, Inc.

DATE: June 27, 2019

RE: Summary of NJDEP Technical Consultation Meeting – May 30, 2019 (REVISED)
Regarding the Hatco Corporation Remediation Project
Fords, Middlesex County, New Jersey
NJDEP PI# G000003943

A meeting pertaining to the Hatco Remediation Project was held on May 30, 2019 at New Jersey Department of Environmental Protection (NJDEP) offices in Trenton, NJ. Meeting attendees were as follows:

In-Person Attendees:
Allan Motter, Technical Coordinator, NJDEP/BEERA
Nancy Hamill, Eco Assessment Technical Coordinator, NJDEP/SRWMP/BEERA
Mark Fisher, President, LSRP, The ELM Group, Inc. (ELM)
Jason Schindler, Project Manager, Weston Solutions
Jim Soukup, Technical Director, Weston Solutions
Andrea McGahan, Principal Geoscientist, Weston Solutions

Via Telephone:
James Haklar, Environmental Engineer, USEPA
Sadira Robles, USEPA
Gina Ferreira, USEPA
Ben Conetta, USEPA

Weston retained Windward Environmental, LLC (Windward) as an ecological expert to prepare an Ecological Risk Assessment Work Plan for development of a site-specific and

risk based remediation goal for bis (2-ethylhexyl) phthalate (BEHP) at Area of Concern (AOC) 25, also previously referenced as "Channel D." As the work plan was developed, it became apparent that a strategy change was appropriate. The LSRP and Weston requested this Technical Consultation with NJDEP to provide a progress update to present recent findings regarding contaminant distribution, pathways, and sources in the marsh, and discuss the path forward for the ecological risk assessment at AOC 25.

MEETING SUMMARY

1. Nancy Hamill (NJDEP) opened the meeting with a statement regarding the purpose of a Technical Consultation. LSRPs are responsible for the direction and oversight of the remediation, but in a Technical Consultation NJDEP can provide guidance. NJDEP cannot provide specific direction or approvals during a Technical Consultation.

HATCO REMEDIATION UPDATE

2. Jason Schindler (Weston) provided a summary of the remediation status at the Hatco site. Weston provides USEPA and NJDEP (Anthony Findley) with monthly progress updates; Weston and the LSRP previously met with NJDEP on February 21, 2017 to review various aspects of the Hatco remediation project, including the ecological risk assessment for Channel D:

- Hatco's lagoons have been remediated with a final cap;
- Accessible light non-aqueous phase liquid (LNAPL) has been removed via excavation (Southeast Leg) and an active skimming system; some LNAPL remains beneath the active area of the plant although considerable progress has been made;
- Cutoff walls and recovery trenches have been installed downgradient of the remaining LNAPL area; containment of the LNAPL has been achieved;
- The Northeast Impoundment/Former Phthalic Anhydride plant waste was remediated and capped;
- Sediment removal in Woodbridge Pond is currently ongoing with completion anticipated by August 2019;
- Preliminary design for the sitewide cap has been completed; plan is to implement the cap construction in late 2019 or early 2020; and
- A Classification Exception Area is in place for dissolved groundwater contamination.

3. Mark Fisher (LSRP) noted that subsequent to the last technical consultation, the chemical plant was transferred from Chemtura to Lanxess.

AOC 25 MARSH – ADDITIONAL CONTRIBUTORS AND CONTAMINANTS

4. Jim Soukup (Weston) distributed an agenda, then gave a presentation on the BEHP and PCB data distribution for AOC 25, the surface water pathways documented in historical aerial photographs and possible sources on adjacent properties to update NJDEP on Weston's current work that identified other contributions to the environmental impact in the marsh.

5. Data Distribution: The highest PCB and BEHP concentrations in the Channel D wetland are found directly east of the former Hartman's Pond, which was located on the eastern edge of the EPEC property. A ditch that connected Hartman's Pond to Crows Mill Creek passed through the areas of highest PCB and BEHP concentration within AOC 25. The distribution pattern is not as would be expected for a single source introducing contaminants from the north/Hatco but rather suggests historical discharges from Hartman's Pond to the west.

6. A viscous NAPL material was observed many years ago beginning on the railroad embankment on the south side of Riverside Drive and extending southward into the marsh; this area was previously documented in prior regulatory submissions, including the RI Report dated May 2016 for the Hatco Site. This area is west of Channel D, which flows from the Hatco site into the wetland. Because the NAPL originates up on the railroad embankment, it could not have flowed there from the former Hatco Site. The material likely originated from historical dumping in this area (unrelated to the Hatco Site). The product is not characteristic of Hatco's LNAPL and has a variable chemical signature and appearance. Allan Motter asked if this release had been called in to NJDEP. In recent discussion with Weston, EPEC's LSRP (Steve Kessel) indicated that it had been reported and a Response Action Outcome (RAO) identifying an offsite source had been issued for this area. Weston has been unable to verify this statement.

7. Suspected Historic Contaminant Pathways. Historical aerial photographs were evaluated using 3-D stereoscopy to identify historical surface water pathways and flow directions for the area. This analysis demonstrated the presence of several suspected pathways from the former EPEC plant to the west of AOC 25 and from GreDel's operations to the east.

8. Industrial operations began at EPEC circa 1920 and surface water pathways from the early industrial areas to Hartman's Pond and from Hartman's Pond out into AOC 25/Crows Mill Creek were documented. The various ponds on the EPEC parcel (West Lake, Middle Pond, and Hartman's Pond) received industrial discharges. Surface water flow through the ponds was west to east, and discharged into AOC 25 since at least 1939 (earliest available photograph). In addition to the long-term discharges, it appears that Hartman's Pond was completely drained into AOC 25 at least once as demonstrated by the 1965 (Hartman's pond full) and 1966 (Hartman's pond empty) aerial photographs. The timing of the pond draining is coincident with EPECs partial filling of Middle Pond to create a parking lot. The pond draining is also observed at the same time that trenches (which appear to have been

manually excavated) are visible in the AOC25 wetland, presumably to accelerate the pond drainage in 1966. The location of the Hartman's Pond outfall and the observed ditches correlate with the distribution of the PCB and BEHP impacts in AOC 25 described above.

9. At the parcel to the east (GreDel), filling began circa 1966 and continued through the 1980s, which included materials such as Supersoil, an imported fill material from New York City that is known to contain PCBs averaging 6.1 mg/kg, and up to 11.7 mg/kg (based on a Deed Notice filed for the GreDel property). Some of this fill material was placed directly onto the marsh surface around 1969.

10. Sources. Possible historical PCB sources on the EPEC parcel included heat transfer fluids, transformers and capacitors. The site had PCB detections in the production areas and there was a capacitor spill that resulted in a cleanup with documented concentrations of up to 150,000 mg/kg of PCBs. EPEC also had toxaphene and other contaminants that could pose ecological risk. These other contaminants have not been investigated or delineated in AOC 25, and are not the responsibility of Weston/Hatco.

11. Additional Discussion. Jim Haklar (USEPA) asked about EPEC's status as a Generator and/or a Treatment, Storage and Disposal facility. Haklar also noted that EPEC filed a PCB cleanup plan that USEPA approved and the cleanup plan stated that "Weston was responsible" for the PCBs. Schindler confirmed that this cleanup plan pertained to a lead berm area. Schindler described the situation related to the remediation of the lead area on the EPEC parcel, and that at the time the parties generally concluded that a portion of the PCBs in that area may have been related to Hatco. At that time, Weston agreed to pay for a portion of EPEC's remediation in that area, which abuts AOC 25b. However, based on the information obtained more recently, it appears that decision was a mistake and it appears that Weston should not have taken any responsibility for that remediation because the PCBs in that area do not appear to be related to Hatco. Weston should not have assumed responsibility for those PCBs as our recent investigation shows Hatco-related PCBs from Channel D did not migrate to that far western location in AOC25. Rather, those PCBs are more likely related to either the NAPL release on the railroad embankment and/or the original release from EPEC that resulted in the lead being there.

12. Soukup stated that Weston needs property owner approvals for access, work plans, sampling and any alternative cleanup levels that may be developed. The fact that Weston does not own the property to be remediated (ACO 25) is a significant complexity factor and could delay the remediation.

ECOLOGICAL RISK ASSESSMENT WORKPLAN FOR BEHP

13. Nancy Hamill (NJDEP) and Andrea McGahan (Weston) discussed the current status of the Ecological Risk Assessment Work Plan for BEHP. The draft work plan has been

completed by Windward and reviewed by the LSRP, but implementation will be delayed until the offsite access and source sampling can be completed. The draft work plan will be revised as necessary based on the results of the planned offsite source sampling. Hamill noted that goals should be calculated for each community and the most conservative goal selected. She also expressed concern that the upper trophic levels be considered, not just the lower levels (micro and macro invertebrates). NJDEP is now stressing the use of one set of NOAEL and LOAEL Toxicity Reference Values (TRVs) for each contaminant-receptor pair). She said that Windward has done other work for the NJDEP so they should be very familiar with what is expected.

14. Gina Ferreira (USEPA) noted that the Risk Assessment would be a Baseline Ecological Risk Assessment (BERA). EPA and NJDEP noted that there are a lot of Risk Assessment components that could be discussed and agreed upon prior to finalizing the work plan. They include wildlife receptors, TRVs and exposure factors.
15. Weston and NJDEP agreed that it is prudent to schedule another Technical Consultation to include Windward to review aspects of the risk assessment that can be agreed upon ahead of time. This will help to expedite the risk assessment once the planned off-site source sampling is completed.

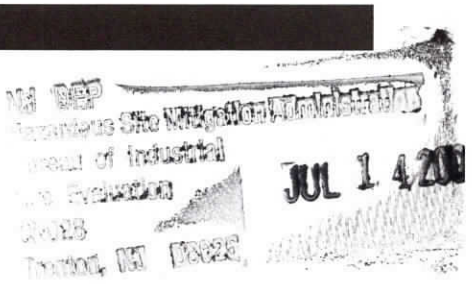
PLAN FORWARD/ACTION ITEMS

16. Weston will provide EPA with RCRA information for the EPEC facility obtained from file reviews and EPA will search their records for information regarding EPEC's use of PCBs and/or BEHP. NJDEP also requested the PI Number associated with EPEC.

17. Weston will submit a high-level summary of the Risk Assessment approach and request for a Technical Consultation. Weston will provide briefing materials ahead of the meeting to facilitate discussion.

18. Weston will provide EPA with regular updates on the access negotiations with adjacent property owners.

SOVEREIGN CONSULTING INC.



11 July 2003

Mr. Henry Kindervatter
New Jersey Department of Environmental Protection
Bureau of Environmental Evaluation Cleanup & Responsibility Assessment
Division of Responsible Party Site Remediation
401 E. State Street, 5th Floor
P.O. Box 432
Trenton, New Jersey 08625-0432

RE: Former Nuodex Corporation Facility
Industrial Avenue
Fords, Woodbridge Township, New Jersey
ISRA Case Nos. 85161 & 89475

Via Overnight Courier

Dear Mr. Kindervatter:

Attached please find an original and two copies of the *Remedial Investigation Work Plan* for soil and groundwater sampling at the above referenced site. This report has been prepared by Sovereign Consulting Inc. (Sovereign) on behalf of EPEC Polymers Inc. (EPI).

If you should have any questions or require additional information, please feel free to contact me at (609) 259-8200 or Mr. Roger Towe of El Paso Corporation (EPC) at (713) 420-4755.

Sincerely,
Sovereign Consulting Inc.

Paul I. Lazaar
Principal Project Manager

c: Project File
R. Towe, EPC

SOVEREIGN CONSULTING INC.

Remedial Investigation Work Plan

Former Nuodex Corporation Facility
Industrial Avenue
Fords, Woodbridge Township, New Jersey
ISRA Case Nos. 85161 & 89475

10 July 2003

Prepared For:

EPEC Polymers, Inc.
1001 Louisiana Street
Houston, Texas 77002

Prepared By:

Sovereign Consulting Inc.
111-A North Gold Drive
Robbinsville, New Jersey 08691

Paul I. Lazaar, P.G.
Principal Project Manager

Ravi Gupta
Principal Engineer

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APPENDICES

1.0 INTRODUCTION

In accordance with the conditions of the 24 January 2003 Remediation Agreement with the New Jersey Department of Environmental Protection (NJDEP), Sovereign Consulting Inc. (Sovereign), on behalf of EPEC Polymers Inc. (EPI), has prepared this *Remedial Investigation Work Plan* (RIWP) for the former Nuodex Corporation facility located on Industrial Avenue in Fords, Woodbridge Township, New Jersey (Figure 1). The specific issues to be addressed are based on the NJDEP's letter dated 5 April 2000, the 12 August 2002 Notice of Violation (NOV), and the "Areas of Concern" summary that was provided to EPI during the 5 February 2003 meeting with the NJDEP.

On 18 August 2000, EPI sold the property to Raritan Venture I, LLC (RVI), which agreed to assume remediation obligations and planned to redevelop the property. RVI entered into a Remediation Agreement with the NJDEP effective the same date, which provided for RVI to complete EPI's obligations for ISRA Case No. 85161 and No. 89475. On 16 January 2002, RVI and its parents LandBank Environmental Properties, LLC and IT Group, Inc. filed voluntary petitions under Chapter 11 of the Bankruptcy Code with the United States Bankruptcy Court for the District of Delaware. As a result, through a "Stipulation By and Among the Debtors, EPEC Polymers, and The Shaw Group Inc." entered by the Bankruptcy Court on 13 December 2002, RVI and its parents were directed to transfer title to the Property back to EPEC Polymers, Inc. To consummate this transfer of the Property, EPI entered into a new Remediation Agreement with the NJDEP in January 2003.

Under the terms of the Bankruptcy Court settlement, RVI and its parents were required to provide EPI all files, reports, test data and results, records, and documents related to the Property, within 30 days of the Effective Date of the settlement. However, after reviewing the files provided, EPI has determined that information on some of the activities conducted by RVI was not provided. Although EPI has made repeated requests to RVI and its parents for this information, none has been forthcoming. Therefore, some of the activities included in this RIWP have been necessitated by the need to try and re-create the data originally obtained by RVI. If the missing data becomes available, the scope of work contemplated by this RIWP may be reduced or changed accordingly.

2.0 SITE BACKGROUND

The following sections summarize specific information that has previously been generated for the site. The primary sources for this information were reports previously generated by Geraghty & Miller (G&M), Princeton Aqua-Sciences (PAS), IT Corporation (ITC), ESCM & Associates, Inc. (ESCM), SECOR International Inc. (SECOR), and Sovereign.

2.1 Site History

The EPI facility was operated by Tenneco Chemicals, Incorporated (Tenneco) as an organic chemical manufacturer of several products including formaldehyde, benzoic acid, chlorotoluene, and toxaphene. The facility was originally licensed by the Atomic Energy Commission (AEC) to handle up to 3,000 pounds of uranium in the form of uranyl nitrate for the production of benzaldehyde. License No. R-114 was issued on 19 April 1956, and expired as License No. SUB-466 on 28 February 1973. It was estimated by the U.S. Nuclear Regulatory Commission (NRC) that the facility used approximately 200 to 400 pounds of uranyl nitrate per year, and that approximately 150 pounds of uranium as U_3O_8 was recovered annually for return to the supplier.

Based on available records and discussions with site personnel, the use of uranyl nitrate was limited to one area of the facility that included Building K-12, the Third Converter Building, and Building K-7. Building K-7 was demolished in 1974. As described in detail in the Radiological Risk Analysis report dated 22 September 1998, the Third Converter Building and Building K-12 were decontaminated between February 1997 and June 1998. Both of these buildings were demolished by RVI sometime between June 2001 and December 2001 as part of the site re-development activities. Chemical manufacturing began in the early 1900's and ceased in 1985. From 1984 to 1988, the facility was used by Hüls America for warehouse storage. The current layout of building structures, surface water bodies, and monitoring wells are shown on Figure 2.

2.2 Site Physiography

The EPI site is located in an industrial area adjacent to the north shore of the Raritan River. The site is approximately 180 acres in size and exhibits very little topographic relief. The northern third of the property is where the former manufacturing facility was located, along with three surface water bodies (West Lake, Middle Lake, and Hartman's Pond). The southern two-thirds of the property is a heavily vegetated low-lying area.

2.3 Local Climate

In general, the climate in the project area is characterized by cool, humid winters and warm, humid summers. Winds within the area typically blow from the southwest quadrant. Rainfall exceeds evaporative losses based on an average annual precipitation of 42.0 inches per year and an average lake evaporation rate of 35.0 inches per year. Therefore, a net 7.0 inches of precipitation is typically available for surface water runoff or infiltration into the subsurface.

2.4 Geologic Conditions

Previous subsurface investigations for the EPI site have been conducted by Converse Ward Dixon, Inc., G&M, Earth Technology Corporation (consultants for the adjacent property owner), ITC, and ESCM. Surficial soils consist of sandy clay mixtures containing variable quantities of organic debris and fill. The site's natural soils are derived from alluvial deposits, marine tidal marsh deposits, and humus from vegetative cover decomposition. An examination of aerial photographs, USGS Quadrangle maps, and US Army Corps of Engineers records show that dredged materials from the Raritan River were placed in the wetlands area of the facility by the Corps of Engineers during the late 1940s and early 1950s. According to the Hüls Cleanup Plan of June 1989, sandy soils predominate in the northern portion of the property and tend to grade to loamy clays towards the Raritan river.

Historical investigations at the site have identified many stratigraphic units typically associated with coastal plain deposits. Locally, the area is underlain by alternating layers of marine and beach deposits consisting of sands, silts, and clays. Within any particular sand layer, discontinuous lenses of clay and silt may occur. The six strata underlying the site are briefly described below:

1. **Fill** - Fill material consisting of multi-colored coarse to fine-grained sand, ranging in thickness from 2 to 4 feet, where encountered.

2. **Organic Silt Interbedded with Silty Clay** - The silty clay and/or organic silt layer is present over the majority of the site. This layer varies locally in organic content and grades into an organic silt. Thickness ranges from 0 to 10 feet and pinches out to the north and east. This clayey silt interfingers with the underlying yellow sand layer. This interfingering of the silt layer decreases as it extends east to west across the site.

3. **Yellow-brown to Gray Coarse to Fine-Grained Sand** - The top of the yellow-brown sand layer is encountered from the ground surface to approximately 10 feet below grade. This water bearing sand layer interfingers with the organic silt layer as the sand layer dips and pinches out to the south. This unit ranges in thickness from 6 to 22 feet and overlies a gray silty clay.

4. **Gray Silty Clay** - A gray silty clay underlies the yellow-brown sand layer and the top of this layer is encountered at a depth of 8 to 30 feet below the ground surface. The gray silty clay varies in thickness from 2 to 5 feet and appears to be continuous across the property.

5. **Interbedded Gray to Brown to Red-brown Sand and Gravel and Brown to Gray Clay and Silt** - This layer appears to be continuous across the site as a semi-confined water bearing sand. The thickness of this layer ranges from 20 feet in the western portion of the site to 40 feet to the east.

6. **Blue-gray Clay** - A blue-gray to olive green silty clay underlies the red-brown sand and gravel layer. This clay layer has been observed in several borings and appears to be continuous across the site. The thickness of the layer ranges from 10 to 43 feet.

2.5 Hydrogeologic Conditions

As summarized in the October 1999 *Remedial Action Work Plan*, previous investigations at the site have shown that there are two primary water bearing zones beneath the site: 1) the unconfined yellow sand shallow water table zone (i.e., the shallow overburden zone); and, 2) the lower red-brown sand and gravel water bearing zone (i.e., the deep overburden zone). The two water bearing zones are separated by a gray silty clay layer. In addition, an area of perched groundwater exists in the northern portions of

the property at depths of 3.0 to 5.0 feet below grade. The perched water is confined to a layer of fire sand that pinches out to the south (towards the middle of the property).

The shallow water bearing zone consists of a yellow brown to gray, coarse-to fine-grained sand and is present under unconfined conditions. The shallow water bearing sand has a thickness ranging from 10 to 20 feet below the industrial portion of the site, and pinches out to the south. This zone is not present throughout the site and is truncated near the former sludge lagoon (area of concern M); this unit is replaced by an organic silt layer to the south. The shallow water bearing zone has a lower boundary consisting of gray silty clay. The upper gray silty clay is approximately 2.0 to 5.0 feet thick with an average thickness of 4.0 feet. The organic silt ranges from zero to 10.0 feet thick beneath the industrial portion of the site. A downward vertical head differential ranging from 0.16 to 5.0 feet exists across this layer. This head differential suggests that the silty clay layer acts as a semi-confining layer for the underlying red-brown sand water bearing zone.

Groundwater flow within both the shallow overburden and deep overburden zones is to the south towards the Raritan River. As originally reported in the January 1988 *Results of Sampling, Analysis, and Hydrogeological Assessments* report, calculated hydraulic conductivity values for the shallow overburden zone range from 2.8×10^{-3} to 5.7×10^{-4} cm/sec. The lower permeabilities were found near the former sludge lagoon and marsh areas, where the yellow-brown sand begins to pinch out and be replaced by the organic silt layer. Hydraulic conductivity values calculated from slug tests for the deep overburden zone ranged from 1.8×10^{-3} to 9.5×10^{-3} cm/sec. Transmissivity values calculated from pump tests for the deep overburden zone range from 600 to 1,500 feet/day. Aquifer test data and laboratory testing have shown that the vertical hydraulic conductivity of the upper clay layer is on the order of 10^{-8} cm/sec, while the hydraulic conductivity of the organic silt layer is on the order of 10^{-6} cm/sec.

3.0 AREAS OF CONCERN

In accordance with NJDEP requirements, the site has been undergoing environmental assessment and cleanup under the NJDEP-ISRA program since 1985. Investigation at the site has included systematic sampling and analysis of soil, groundwater, sediment, and surface water samples from 39 Areas of Concern (AOCs). The primary contaminants of concern identified at the site include: priority pollutant metals (PPM; primarily arsenic, chromium, lead, mercury, nickel, and zinc), total petroleum hydrocarbons (TPH), chlorotoluene, total xylenes, ethylbenzene, toxaphene and uranium 238 (U238). The NJDEP has reviewed numerous reports detailing findings of soil, groundwater, sediment and surface water investigations, groundwater fate and transport modeling, pilot studies, risk assessments, and proposed remedial action or cleanup plans. Various AOCs have undergone active remediation since 1994. Remediation efforts have included Air Sparging, Vacuum Extraction, Landfill Cover, Landfill Paving, Lagoon Cover, Methane Co-metabolism, Asbestos Removal, Soil Excavation, and Deed Recordings. The locations of the AOCs at the site are shown on Figure 3.

The following Table summarizes those AOCs that do not require further assessment/remediation and have received NJDEP's approval relative to future remedies and/or actions:

AOCs Requiring No Further Action	
AOC	Description
A	Background
C	Landfill L-1 (North)
D	Non-Production Area
E1	Transformer Spill (Building 55 Parking Lot)
E2	1,000 gallon Waste Oil Underground Storage Tank (UST) - Building 56
E3	2,000 gallon Gasoline UST (Building 57)
E4	Septic System (Building 56)
F1	Transformers (Building 23)
F2	Three, 10,000 gallon No. 2 Fuel Oil USTs

AOCs Requiring No Further Action	
AOC	Description
F3	Transformers (Building 25)
F4	Three, 20,000 gallon No. 2 Fuel Oil USTs (Building 22)
F5	Transformers (Building 37)
H1	Formaldehyde Production Area (Buildings 20 - 24)
H2	Sewage Pit
M1	Sludge Lagoons
M2	Wastewater Treatment Facility
N	Landfill L-2 (South)
SS1	Septic System (Building 40)
SS2	Septic System (Building 36A)
SS3	Sewer Junction Boxes

During the 5 February 2003 meeting with the NJDEP, EPI was provided with a list summarizing outstanding issues for the following 14 AOCs that required additional investigation and/or remediation:

AOCs Requiring Further Investigation and/or Remediation	
AOC	Description
B1	West Lake Sediments
B2	Middle Lake Sediments
B3	Hartman's Pond Sediments
G	Plant Production Area Loading Bays (Building 49)
I	Maleic Production Area
J	Former Production Area
K	Drum Storage Area near Building 60
L	Former Production Area "S-1" - Five Large Tanks

AOCs Requiring Further Investigation and/or Remediation	
AOC	Description
M	Radioactive Impacted Soils adjacent to former Building K-12
O	Sludge Disposal from Waste Lagoons (AOC-M)
P	Wetlands (15 acres)
Q	Stressed Vegetation Areas (two in AOC-L; two in AOC-O)
R	Salt Marsh (Adjacent to AOC-O)
W1-W5	Groundwater Impacts - Site Wide

In their letter dated 5 April 2000, the NJDEP approved a proposal to fill Hartman's Pond and the Middle Lake as a remedy for the metals contamination noted in these AOCs. It should be noted that even though the NJDEP-ISRA has agreed with the conceptual plan, the concept still needs approval from other agencies. Relative to the radiological assessment and cleanup at the site (Area M), it should be noted that even though the Nuclear Regulatory Commission (NRC) reviewed the radiological assessment and cleanup data and approved the site for unrestricted industrial/commercial use, the area of radiological impact has not met NJDEP remediation requirements and requires further investigation.

In addition to the AOCs identified by the NJDEP, investigations conducted by RVI identified three areas of possible dense non-aqueous phase liquids (DNAPLs) at the site. As discussed in the October 2001 *Free Product Field Investigation* Report, DNAPL was detected in soil adjacent to the southwest corner of Hartman's Pond and beneath the west end of the blended soil pile associated with radioactive contaminated soil near former Building K-12. For the purposes of this RIWP, these two areas have been designated AOC-1 and AOC-2, respectively. Historical groundwater information reviewed during the preparation of this RIWP suggests that DNAPL may also be present in AOC-J, although no sampling has been conducted to investigate this possibility.

EPI questions RVI's conclusions that DNAPL is present at the site. In AOC-1 and AOC-J, chlorotoluene is the primary contaminant identified in soil and groundwater. It should be noted that chlorotoluene has a density only slightly heavier than that of water, and historically has never manifested itself as a

separate phase. EPI is not aware of any gauging data indicating that measurable amounts of DNAPL have ever been detected in any wells at the site. In AOC-2, the VOCs in soil are different from those in AOC-1, and are present at much lower concentrations. EPI believes that if a separate phase liquid is present in AOC-2, it would most likely manifest itself as a light non-aqueous phase liquid (LNAPL). It should be noted that the field testing conducted by RVI cannot differentiate between a DNAPL or an LNAPL.

In their Notice of Violation (NOV) letter dated 12 August 2002, the NJDEP cited "...a pile of what appear to be transformer bussings ... on a cracked cement pad at the site." A further discussion of the actions taken by the NJDEP to address this site condition is provided in Section 3.16 of this report. EPI has designated this area of the site as AOC-3.

3.1 AOCs-B1, B2, & B3 (West Lake, Middle Lake, and Hartman's Pond)

West Lake, Middle Lake, and Hartman's Pond are located along the northern portions of the property (see Figures 2 & 3). Previous reviews of aerial photographs have indicated that West Lake and Middle Lake were in existence prior to 1940, and that Hartman's Pond was created between 1962 and 1967 as a fire water supply.

West Lake is a flood-control pond that collects storm water from off-site and the northern section of the property. This retention pond discharges into a small stream that meanders through an adjacent property and then flows into the Raritan River, located along the southern boundary of the site. Hartman's Pond is located in the front portion of the property and is adjacent to the North Landfill that has been capped and closed. Middle Lake is also located in the front portion of the Ford site and abuts the western edge of the North Landfill. Middle Lake at one time received storm water runoff from off-site sources before discharging to the West Lake via an underground pipe. However, due to changes in site drainage made by RVI, Middle Lake now only receives localized storm water run-off. Hartman's Pond is not associated with storm water collection/discharge at this site and was used as a Fire Pond by the facility.

The sediments in these AOCs have been found to contain priority pollutant metals (arsenic, chromium, lead, mercury, nickel, and zinc) at concentrations above the NJDEP's Non-Residential Direct Contact Cleanup Criteria (NRDCCC). The sediments in these AOCs also contain levels of metals above the Median Effects Range (ER-M) level published by the National Oceanic and Atmospheric Administration (NOAA). In their 5 April 2000 letter, the NJDEP approved a proposal to fill Hartman's Pond and the Middle Pond as a remedy for the metal contamination noted in these AOCs. It should be noted that even though the NJDEP-ISRA has agreed with the conceptual plan, the concept needs approval from other agencies. The NJDEP's 5 April 2000 correspondence concludes that remediation of West Lake is required due to the presence of metals in the sediment samples at concentrations above NJDEP sediment screening criteria. The NJDEP stated that fish tissue sample results indicated that the contamination is bio-available and could have adverse impacts to upper trophic level receptors.

In the October 2000 *Remedial Action Work Plan*, RVI proposed, as part of their redevelopment plans for the site, to remediate the sediments in West Lake via excavation and ex-situ stabilization, and the sediments in Middle Lake and Hartman's Pond via in-situ stabilization. At the completion of the remediation activities, Middle Lake and Hartman's Pond would have been filled in with stabilized material, while West Lake would have continued to serve as the collection point for storm-water runoff from the northern portion of the site.

EPI has reviewed the available information and, considering the changed circumstances (redevelopment by RVI) and the limited information relative to the actual or potential ecological impacts of the metals of concern, proposes to re-evaluate the proposed remedial options for addressing the sediments in West Lake. EPI will review all of the data that has been collected to date from West Lake to determine if further ecological assessment is required. If it is determined that a qualitative and/or a quantitative appraisal of the actual or potential ecological impacts needs to be conducted, EPI will prepare a Work Plan for conducting such an assessment and submit it to the NJDEP for review and approval prior to its implementation.

3.2 AOC-C (Landfill L-1 North)

In Item 3 of the 12 August 2002 NOV letter, the NJDEP indicated that the asphalt cap over the northern landfill needed to be repaired. As indicated in their 22 April 2003 letter to the NJDEP, EPI contracted F. Di Girolamo & Son, Inc. (Di Girolamo) to have the vegetation growing through the asphalt cover on the landfill removed, and the surface of the cover restored. The southern third of the cover (closest to Hartman's Pond) was re-surfaced with two new inches of asphalt. Any cracks in the remaining portions of the asphalt cover were sealed with tar. The repairs to the asphalt cap over the Northern Landfill (Figure 4) were completed on 30 May 2003.

The NJDEP indicated that a deed notice for the Northern Landfill needed to be included in the overall site-wide deed notice. A Declaration of Environmental Restriction (DER) was filed with the Middlesex County Clerk's office on 20 November 1998 for the Northern Landfill. A copy of the DER was submitted to the NJDEP as part of EPI's 22 April 2003 letter.

3.3 AOC-G (Plant Production Area Loading Bays [Building 49])

As shown on Figure 5, the remediation area for AOC-G was located to the east of Building 49, and covered an area of approximately 23,480 ft^2; the primary compound of concern in this AOC is chlorotoluene. In the *3rd Revised Cleanup Plan* dated 13 August 1993, air sparging was proposed to facilitate the bioremediation of chlorotoluene in both the vadose and saturated soil zones. The site specific cleanup levels for chlorotoluene in soil and groundwater are 9.3 parts per million (ppm) and 50.0 parts per billion (ppb), respectively. The remediation system operated from June 1995 through December 1995, at which point it was shut down for the winter. In March 1996, post-remediation soil samples were collected to document the effectiveness of the remediation system. A *Remedial Investigation Report* summarizing the results of post-remediation soil samples was submitted to the NJDEP on 1 October 1996.

The analytical results for the post-remediation soil samples indicated that chlorotoluene concentrations had been reduced to below the site specific cleanup criteria in all samples. However, the NJDEP

indicated in their letter dated 24 October 1997, and reiterated during the February 2003 meeting with EPI, that the quality assurance/quality control (QA/QC) data for five of the six samples collected were deficient and that the results were not acceptable. Due to the time that has elapsed since the samples were collected, EPI proposes to collect a new round of post-remediation samples from this AOC.

3.3.1 *Soil Sampling Program*

In accordance with the *Technical Requirements for Site Remediation*, EPI proposes to collect post-remediation soil sampling as per N.J.A.C. 7:26E-6.4 et seq. Soil borings would be installed at a frequency of one per 900 ft^2 over the remediation area (see Figure 5). Each boring would be advanced to four feet below grade, and one sample would be collected from the six inch interval within each two foot horizon that exhibits the highest field screening results or obvious signs of contamination (i.e., odors or staining). If all field screening results in a boring are negative (i.e., no contamination is observed), soil samples would be collected from 1.5 - 2.0 feet and 3.5 - 4.0 feet below grade. The soil borings would be installed using Geoprobe methodology. The Geoprobe would be operated by a New Jersey licensed driller under the supervision of a Sovereign geologist. Soil samples would be collected into acetate liners within a stainless steel sampler. Each liner would be removed from the sampler, slit open, and screened for volatile organic compounds (VOCs) using a photo-ionization detector (PID) equipped with a 10.6 eV bulb. The descriptions of soil lithologies, results of PID screening, and the depths of the samples collected would be recorded in the field.

Samples for laboratory analyses would be collected from undisturbed soil following the NJDEP's Methanol Preservation Procedures. Soil samples would be placed directly into laboratory-provided sample containers, labeled, logged onto a chain of custody form, and placed on ice in a cooler. Each sample would be analyzed for chlorotoluene by USEPA Method 8260. At the end of the day, the samples would be returned to Sovereign's office, where they would be picked up the following day by a courier and delivered to Accutest in Dayton, New Jersey (Certification No. 12129) for analysis. For quality assurance/quality control (QA/QC) purposes, one trip blank sample would also be submitted and analyzed for chlorotoluene for each day of sampling.

3.3.2 *Groundwater Sampling Program*

EPI proposes to collect a groundwater sample from monitoring well G4D to document current concentrations of chlorotoluene. The groundwater sampling program for the site is discussed in Section 4.0 of this report.

3.4 AOC-I (Maleic Anhydride Production Area)

As shown on Figure 6, the remediation area for AOC-I was located to the southeast of Building 31, and covered an area of approximately 20,650 ft^2; the primary compounds of concern in this AOC are ethylbenzene and xylenes. In the *3rd Revised Cleanup Plan* dated 13 August 1993, air sparging and soil vapor extraction were proposed to remediate the VOCs in both the vadose and saturated soil zones. The NJDEP's current Impact to Groundwater Cleanup Criteria (IGWCC) for ethylbenzene and xylenes in soil are 100 ppm and 67.0 ppm, respectively. The NJDEP's current Groundwater Quality Standards (GWQS) for ethylbenzene and xylenes are 700 ppb and 1,000 ppb, respectively. Post-remediation soil samples were collected to document the effectiveness of the remediation system on 31 October 1996. A *Remedial Investigation Report* summarizing the results of post-remediation soil samples was submitted to the NJDEP on 3 December 1996. The remediation system for this AOC was shut down in September 1998.

In their letter dated 24 October 1997, the NJDEP indicated that concentrations of xylenes remained at concentrations above the Impact to Groundwater Cleanup Criteria (IGWCC), which at the time was 10.0 ppm; at least one sample contained xylenes at a concentration that would also have exceeded the current IGWCC of 67.0 ppm. In addition, the NJDEP indicated that additional sampling was required to complete the delineation of the VOCs in this AOC.

3.4.1 *Soil Sampling Program*

In accordance with the *Technical Requirements*, EPI proposes to collect post-remediation soil samples from across the remediation area (see Figure 6). Each boring would be advanced to four feet below grade, and one sample would be collected from the six inch interval within each two foot horizon that exhibits the highest field screening results or obvious signs of contamination. If all field screening results in a boring are negative, soil samples would be collected from 1.5 - 2.0 feet and 3.5 - 4.0 feet below grade. The soil borings would be installed using Geoprobe methodology following the procedures discussed in Section 3.3.1, above. Each sample would be analyzed for VOC+10+chlorotoluene by USEPA Method 8260.

3.4.2 *Monitoring Well Installation*

Groundwater samples from October 2001 indicate that monitoring wells I51S and I52S still contain concentrations of benzene, ethylbenzene, toluene, xylenes, and/or chlorotoluene that exceed their respective GWQS. During the February 2003 meeting with EPI, the NJDEP indicated that at least one monitoring well would be required to the west of I52S to complete the delineation of the dissolved phase VOCs in this well.

As shown on Figure 7, EPI proposes to install two monitoring wells approximately 100 feet to the west of I52S (to be designated MW-8), and approximately 150 feet to the east of I52S (to be designated MW-9). Both wells would be installed by a licensed New Jersey well driller under the supervision of a Sovereign geologist using a hollow-stem auger drill rig, and split spoon samplers would be advanced through the augers to collect samples of undisturbed soil for lithologic description. Consistent with well I52S, MW-8 and MW-9 would have total depths of approximately 15.0 feet, and would be constructed with 10.0 feet of 4.0-inch diameter, 20-slot Sch. 40 PVC screen and 5.0 feet of PVC casing. Each well would be completed with protective steel standpipe and locking cap. The locations and elevations of MW-8 and MW-9 would be measured by a New Jersey licensed surveyor, and Well Certification Forms A & B would be completed.

3.4.3 *Groundwater Sampling Program*

EPI proposes to collect two rounds of samples from monitoring wells MW-8 and MW-9 to document VOC concentrations in groundwater to the west and east of I52S. At least one round of samples would be collected concurrently with samples from I51S and I52S. The groundwater sampling program for the site is discussed in Section 4.0 of this report.

3.5 AOC-J (Former Production Area S-2)

As shown on Figure 8, the remediation area for AOC-J was located to the north of Building 60, a former warehouse used for drum storage, and covered an area of approximately 47,890 ft^2; the primary compound of concern in soil in this AOC is chlorotoluene. In the *3rd Revised Cleanup Plan* dated 13 August 1993, air sparging and soil vapor extraction were proposed to remediate the chlorotoluene in both the vadose and saturated soil zones. Post-remediation soil samples were collected to document the effectiveness of the remediation system on 1 November 1996. A *Remedial Investigation Report* summarizing the results of post-remediation soil samples was submitted to the NJDEP on 3 December 1996. The remediation system in this AOC has been shut down since October 1998.

The analytical results for the post-remediation soil samples indicated that chlorotoluene remained in the soil at concentrations above the site specific remediation criterion of 9.3 ppm. Therefore, the NJDEP indicated during the February 2003 meeting with EPI that additional soil remediation would be required.

3.5.1 *Soil Sampling Program*

Due to the time that has elapsed since the last round of soil samples were collected, EPI proposes to collect a new set of post-remediation soil samples in accordance with the *Technical Requirements*. Soil borings would be installed at a frequency of one per 900 ft^2 over the remediation area (see Figure 8). Each boring would be advanced to four feet below grade, and one sample would be collected from the six inch interval within each two foot horizon that exhibits the highest field screening results or obvious

signs of contamination. If all field screening results in a boring are negative, soil samples would be collected from 1.5 - 2.0 feet and 3.5 - 4.0 feet below grade. The soil borings would be installed using Geoprobe methodology following the procedures discussed in Section 3.3.1, above. Each sample would be analyzed for chlorotoluene by USEPA Method 8260.

Based on the dissolved concentrations of chlorotoluene that were present in monitoring wells J7D, J8D, J70S, and J70D during the quarterly groundwater sampling events conducted by RVI in 2001, there is a possibility that DNAPL may be present in AOC-J. As indicated earlier in Section 3.0, questions whether DNAPL is present in this AOC (based on the physical characteristics of chlorotoluene). However, EPI proposes to conduct a DNAPL investigation in conjunction with the post-remediation sampling discussed above. As part of this investigation, EPI proposes to use a Ribbon NAPL Sampler (RNS) manufactured by Flexible Liner Underground Technologies, Ltd. (FLUTe). The following description of the RNS technology has been taken from the Interstate Technology and Regulatory Cooperation (ITRC) Work Group's June 2000 *Dense Non-Aqueous Phase Liquids (DNAPLs): Review of Emerging Characterization and Remediation Technologies* report.

> The RNS is a continuous, direct sampling device that can provide detailed, depth discrete mapping of NAPLs (liquid solvents and/or petroleum products) in a borehole. This NAPL characterization technique uses a flexible membrane system consisting of an impermeable liner and an exterior covering on the liner which reacts with pure product (e.g., NAPL and DNAPL) to form a bright red dye stain on a white background. The pressurized liner forces the reactive cover tightly against the borehole wall. The reactive ribbon is recovered from the hole by inverting/peeling the liner from the hole. In this manner, the reactive ribbon does not touch the hole wall anywhere else as it is removed. The reactive ribbon can then be examined for the presence and extent of layers, and even globules, of NAPL in the subsurface as indicated by red marks on the ribbon. RNS can be deployed with direct push (e.g., Geoprobe) methods for mapping of NAPLs and DNAPLs in both the vadose and saturated zones to identify source regions.

EPI believes using the RNS should expedite the investigation in AOC-J by allowing a rapid determination to be made as to the presence of DNAPL in a soil boring. A total of 25 RNS' would be installed at the locations shown on Figure 9. Each RNS boring would be advanced to the top of the gray silty clay semi-confining layer (estimated to be present at 17 to 25 feet below grade in this area of the site). The RNS would be installed and initially kept in the borehole for a minimum of 30 minutes; the

time the RNS remains in the borehole may be adjusted depending on site conditions. Each borehole would be grouted to grade immediately following the retrieval of the RNS.

Once all of the RNS' have been retrieved and inspected, EPI would install additional soil borings from select locations as necessary to characterize soil lithologies and to collect samples for laboratory analyses. This phase of soil sampling would be performed using Geoprobe dual-tube methodology. In this sampling mode, soil samples are collected through outer steel casing that serves to keep the borehole from collapsing, as well as minimizing any potential vertical migration of DNAPL from shallower to deeper zones. Soil samples would be collected from intervals where the RNS indicated DNAPL was present, as well as intervals where no DNAPL was detected. Each DNAPL investigation soil sample would be analyzed for volatile organic compounds (including calibrations for chlorotoluene) plus an NBS library search (VOC+10) by USEPA Method 8260.

3.5.2 *Groundwater Sampling Program*

In conjunction with the DNAPL soil sampling investigation, EPI proposes to collect groundwater samples from monitoring wells J7S, J7D, J8D, J9S, J10S, J70S and J70D to document current concentrations of VOCs and chlorotoluene. The groundwater sampling program for the site is discussed in Section 4.0 of this report.

3.6 AOC-K (Drum Storage Area [Building 60]) & AOC-L (Former Production Area "S-1")

AOC-K and AOC-L were used primarily for the production and storage of toxaphene. From late 1995 through the Fall of 1998, an in situ, methane co-metabolism bioremediation system was operated to address contaminated soil over an area of approximately 125,000 ft^2. Although it appears that the remediation system was successful in reducing the levels of toxaphene in soil, concentrations still remain that exceed the NJDEP's NRDCCC of 0.2 ppm. EPI proposes no further sampling for these AOCs, and will establish a DER with engineering controls for these areas of the site as part of the Revised RAW.

3.7 AOC-M1 (Sludge Lagoons)

EPI has determined that although a DER for AOC-M1 was submitted to the NJDEP for review and approval, it was never filed with the Middlesex County Clerk's office. EPI has begun the necessary proceedings to have the DER filed for AOC-M1. A copy of the DER will be submitted to the NJDEP upon its completion.

3.8 AOC-N (Landfill L-2 [South])

A DER for AOC-N (the Southern Landfill) was filed with the Middlesex County Clerk's office on 20 November 1998. A copy of the DER was submitted to the NJDEP in EPI's letter dated 22 April 2003.

3.9 AOC-O (Sludge Disposal from Lagoons [AOC-M])

Previous sampling has determined that the soil within this AOC contains elevated concentrations of metals (primarily arsenic). EPI does not propose any additional sampling for this AOC. EPI's strategy for addressing the metals contamination present in this AOC will be submitted to the NJDEP as part of the Revised RAW.

3.10 AOC-P (Wetlands [15 acres])

Previous sampling has determined that the soil within this AOC contains elevated concentrations of metals (primarily arsenic). A review of historical land use at the site has determined that the contamination in this AOC can be attributed to dredge spoils from the Raritan River that were placed on the site by the Army Corp of Engineers. EPI does not propose any additional sampling at this time. EPI's strategy for addressing the metals contamination present in this AOC will be submitted to the NJDEP as part of the Revised RAW.

3.11 AOC-Q (Stressed Vegetation Areas [2 in AOC-L, 2 in AOC-O])

Previous sampling has determined that the soil within this AOC contains elevated concentrations of metals (primarily arsenic). It should be noted that no signs of stressed vegetation have been observed during recent site inspections. EPI does not propose any additional sampling for this AOC. EPI's strategy for addressing the metals contamination present in this AOC will be submitted to the NJDEP as part of the Revised RAW.

3.12 AOC-R (Salt Marsh)

Previous sampling has determined that the soil within this AOC contains elevated concentrations of metals (primarily arsenic). A review of historical land use at the site has determined that the contamination in this AOC can be attributed to dredge spoils from the Raritan River that were placed on the site by the Army Corp of Engineers. EPI does not propose any additional sampling at this time. EPI's strategy for addressing the metals contamination present in this AOC will be submitted to the NJDEP as part of the Revised RAW.

3.13 AOC-M (Benzaldehyde Production Area [Building K-12])

The location of the radiation affected soil pile associated with former Building K-12 is shown on Figure 10. As was discussed in IT Corporation's *Radioactive Soil Investigation Report* dated September 2000, a final status survey of the blended soil pile and the adjacent land area was conducted to determine residual U-238 concentrations. In conjunction with the NJDEP, IT Corporation delineated the following three distinct survey areas:

Class 1 - defined by the boundary of the blended soil pile;

Class 2 - a 10,000 square meter area around the perimeter of the Class 1 area; and,

Class 3 - the remaining portion of the site not included in either the Class 1 or Class 2 areas, nor areas where other site structures would preclude performing a radiation survey of near surface soil.

EPI has been unsuccessful in obtaining information from RVI on the radioactive soil survey and sampling work that was conducted for this area of the site. On 24 June 2003, representatives of Sovereign met with the NJDEP to determine what information was available in the NJDEP's files, and to discuss general strategies for collecting the data necessary to fill the data gaps from IT Corporation's survey. As was agreed during the meeting, EPI will prepare a separate Work Plan to address the sampling requirements for this area of the site. Should the RVI survey results become available, this work may be rendered unnecessary. In that event, the RVI results will be submitted to the NJDEP in lieu of a separate Work Plan for this AOC.

3.14 AOC-1 (Hartman's Pond DNAPL Area)

As shown on Figure 11, AOC-1 is located between the southwest corner of Hartman's Pond and former Building 49. As part of RVI's investigation of this AOC, a total of 60 soil samples were collected from 15 soil borings in October/November 2000 and August 2001. The results of this investigation were submitted to the NJDEP in the October 2001 *Free Product Field Investigation Report*. The primary VOCs detected in this AOC are chloroform, toluene, chlorobenzene, and chlorotoluene. As indicated earlier in Section 3.0, EPI questions RVI's conclusions that DNAPL is present in this AOC. However, EPI has reviewed the information included in the *Free Product Field Investigation Report*, and has determined that additional samples need to be collected to complete the vertical delineation of the VOCs detected in this AOC. EPI's plans for remediating this AOC will be included in the Revised RAW.

3.14.1 *Soil Sampling Program*

EPI proposes to collect additional soil samples to complete the vertical delineation of the VOCs detected in samples from borings GB-2, GB-3, GB-5, and GB-41 (see Figure 12). Soil samples would be collected from at least 30.0 feet below grade for GB-2, 25.0 feet below grade for GB-3, 28.0 feet below

grade for GB-5, and 22.0 feet below grade for GB-41. Soil sampling would be performed using Geoprobe dual-tube sampling methodology. All other sampling procedures would be as described in Section 3.3.1, above. Soil samples collected for laboratory analysis would be analyzed for VOC+10+chlorotoluene by USEPA Method 8260.

3.15 AOC-2 (Radiation Affected Soil DNAPL Area)

As shown on Figure 13, AOC-2 is located near the west end of the blended soil pile associated with former Building K-12 in AOC-M. As part of RVI's investigation of this AOC, a total of 69 soil samples were collected from 26 soil borings in November 2000. The results of this investigation were submitted to the NJDEP in the October 2001 *Free Product Investigation Report*. The primary VOCs detected in this AOC were xylenes and chlorotoluene. As indicated earlier in Section 3.0, EPI questions RVI's conclusions that DNAPL is present in this AOC. However, after reviewing the information included in this report, EPI has determined that additional soil sampling is required to complete the horizontal delineation of the VOCs detected during the initial investigation.

3.15.1 *Soil Sampling Program*

EPI proposes to collect additional soil samples to complete the horizontal delineation of the VOCs detected in samples from borings GB-22 and GB-23 (see Figure 14). Soil samples would be collected from 3.0 - 3.5 feet below grade from one boring to the west of GB-22, and from 7.0 - 7.5 feet below grade from borings to the east and south of GB-23. Soil sampling would be performed using Geoprobe dual-tube sampling methodology. All other sampling procedures would be as described in Section 3.3.1, above. Soil samples collected for laboratory analysis would be analyzed for VOC+10+chlorotoluene by USEPA Method 8260.

3.15.2 *Monitoring Well Installation*

In order to determine if non-aqueous phase liquids (NAPLs; either sinking or floating) are present beneath the soil pile, EPI proposes to install one monitoring well adjacent to the soil boring with the highest VOC concentrations (GB-16; see Figure 15). Monitoring well MW-10 would be installed by a licensed New Jersey well driller under the supervision of a Sovereign geologist using a hollow-stem auger drill rig, and split spoon samplers would be advanced through the augers to collect samples of undisturbed soil for lithologic description. MW-10 would have a total depth of approximately 20.0 feet, and would be constructed with 15.0 feet of 4.0-inch diameter, 20-slot Sch. 40 PVC screen and 5.0 feet of PVC casing. The well would be completed with protective steel standpipe and locking cap. The location and elevation of MW-10 would be measured by a New Jersey licensed surveyor, and Well Certification Forms A & B would be completed.

3.15.3 *Groundwater Sampling Program*

EPI proposes to collect two rounds of samples from monitoring well MW-10 to document VOC concentrations in groundwater beneath the soil pile. The groundwater sampling program for the site is discussed in Section 4.0 of this report.

3.16 AOC-3 (Concrete Pad with Leaking Capacitors)

The following discussion of the NJDEP's activities associated with this area of concern has been taken from a 4 November 2002 memorandum written by Mr. Charles Dispoto of the NJDEP's Bureau of Construction (see Appendix A). Between 31 October 2002 and 1 November 2002, the NJDEP and their environmental contractor responded to a complaint about transformers leaking oil contaminated with high concentrations of polychlorinated biphenyls (PCBs). The NJDEP found that a telephone pole with 12 small capacitors had fallen and was staged on a round concrete pad (see Figure 16). The capacitors were found to be leaking oil, some of which was found have run off the pad and stained the ground at the edges of the pad. The NJDEP's contractor placed the capacitors in drums, cleaned the spilled oil from

the concrete pad, and removed all visibly contaminated soil from along the edges of the pad. No post-excavation samples were collected to document the levels of PCBs that may remain in the soil around the pad. All waste materials were drummed and staged on-site near the former construction trailer pending off-site disposal (see Section 6.0 for a discussion actions taken to address these drums).

3.16.1 *Soil Sampling Program*

Since no post-excavation soil samples were collected by the NJDEP's contractor, EPI proposes to collect samples from around the concrete pad to document the levels of PCBs remaining in the soil. In accordance with the *Technical Requirements*, EPI proposes to collect eight soil samples from four soil borings to be located around the concrete pad (see Figure 17). Soil samples would be collected from 0.0 - 0.5 feet and 1.5 - 2.0 feet below grade in each boring. The soil borings would be installed using Geoprobe methodology following the procedures discussed in Section 3.3.1, above. Each sample would be analyzed for PCBs by USEPA Method 8082.

4.0 GROUNDWATER SAMPLING PROGRAM

Item II.4 of the NJDEP's 5 April 2000 letter required that additional monitoring wells be installed near the Raritan River for the purposes of completing the horizontal delineation of the dissolved phase contaminants. After reviewing the files provided by RVI, EPI has determined that three monitoring wells (MW-5, MW-6, and MW-7) have been installed along the Raritan River (see Figure 2). Based on information obtained from the NJDEP's Bureau of Water Allocations, each of these wells is 17.0 feet deep, and is constructed with 15.0 feet of 4.0-inch diameter PVC well screen and 2.0 feet of casing. EPI has been unable to determine if any groundwater samples have been collected from these wells.

The NJDEP indicated during the February 2003 meeting with EPI that additional delineation and remediation of known areas of groundwater contamination would be required. In addition, a Classification Exception Area (CEA) strategy would need to be developed. EPI's groundwater remediation program for the site will be discussed as part of the Revised RAW. However, in order to develop a groundwater monitoring and remediation program, additional groundwater sampling needs to be conducted.

4.1 Wells to be Sampled

EPI proposes to implement three separate groundwater sampling programs as part of this investigation. The first sampling program would involve collecting an extensive round of groundwater samples to provide a comprehensive assessment of current groundwater conditions at the site. The second sampling program would involve collecting confirmation samples from newly installed monitoring wells MW-8, MW-9, and MW-10. Finally, the third sampling program would involve collecting quarterly groundwater samples from monitoring wells MW-5, MW-6, and MW-7 for the purposes of establishing a data base to be used for the CEA calculations. Each of these sampling programs is discussed separately, below.

4.1.1 *Comprehensive Sampling Program*

In order provide a comprehensive assessment of current groundwater conditions, EPI proposes to collect groundwater samples from the 77 wells that currently exist at the site, plus the three new wells that are proposed to be installed (i.e., MW-8, MW-9, and MW-10). The following table summarizes the analytical parameters for each well.

Analytical Parameters for Comprehensive Groundwater Sampling Event		
Well ID	Parameter	Method
All Wells	VOC+10 + Chlorotoluene	8260
MW-1 through MW-10, J7S, J7D, J10S, J70S, J70D, L30S, L30D	BNA+25	8270
MW-1 through MW-10, B27D, J10S, J70S, J70D, L30S, L45S, M37D2, R20D	Pesticides	8081
MW-1 through MW-10, B27D, J10S, J10D, L30S, L30D, M6D, M22D, O21D, O33S, R20D	PPM	200 Series
Notes: VOC+10 = Volatile organic compounds plus an NBS library search. BNA+25 = Base neutral/acid extractable compounds plus an NBS library search. PPM = Priority pollutant metals (including barium).		

The wells to be analyzed for BNA+25, pesticides, and PPM were selected based on either 1) the well had never been sampled (i.e., MW-1 through MW-10), or 2) the well had been required to be analyzed for the parameter during the previous quarterly monitoring program.

4.1.2 *Confirmation Sampling Program*

A minimum of 30 days following the completion of the comprehensive groundwater sampling event, a confirmation round of groundwater samples would be collected from MW-1 through MW-10. Each groundwater sample would be analyzed for VOC+10+chlorotoluene, BNA+25, pesticides, and PPM.

4.1.3 *Quarterly Sampling Program*

During verbal communications with Sovereign, the NJDEP indicated that at least eight quarters of data from monitoring wells MW-5, MW-6, and MW-7 (located along the Raritan River) will be needed prior to establishing a CEA for the site. Since these wells represent the most downgradient monitoring points at the site, the groundwater samples from these wells would be analyzed for VOC+10+chlorotoluene, BNA+25, pesticides, and PPM. EPI will commence quarterly sampling of MW-5, MW-6, and MW-7 within 90 days of the completion of the comprehensive groundwater sampling event discussed in Section 4.1.1, above.

4.2 Groundwater Sampling Procedures

In accordance with the NJDEP's *Technical Requirements*, groundwater sampling would performed following the procedures outlined in the May 1992 "Field Sampling Procedures Manual". Prior to sampling, each well would be gauged to measure the depth to groundwater and to determine the presence/absence of light non-aqueous phase liquids (LNAPLs) and DNAPLs using an interface probe capable of detecting separate phase liquid layers as thin as 0.01 feet. Approximately three well volumes would then purged from each well to remove stagnant water and ensure that the sample to be collected would be representative of the water quality in the shallow and deep overburden zones.

For most wells, purging would performed using a submersible 12 volt, PVC and stainless steel, electric pump and dedicated vinyl tubing. For wells with diameters of less than 2.0 inches, a surface mounted centrifugal or peristaltic pump would be used. In accordance with the "Field Sampling Procedures Manual", the following information would be recorded during the purging and sampling of each well:

<u>Before Purging</u>

- Date, time, and weather conditions
- Well number
- Head space reading immediately after well cap is removed
- Product thickness, if any
- pH, dissolved oxygen, temperature, specific conductivity
- Total depth of well from top of casing (TOC)

- Depth from TOC to top of screen
- Depth to water from TOC
- Estimated volume of water in well

After Purging

- Start and end time of purging
- Purge method
- Purge rate(s)
- Total volume purged
- Depth to water after purging
- pH, dissolved oxygen, temperature, specific conductivity

Before Sampling

- Depth to water from TOC

After Sampling

- Start and end time of sampling
- pH, dissolved oxygen, temperature, specific conductivity
- Sampling method

Groundwater samples would be collected using a disposable Teflon bailer and dedicated nylon string. Samples for VOC analyses would be collected from the first bailer of water recovered from each well. Each sample container would be labeled, logged on a chain-of-custody form, and placed on ice in a cooler. One trip blank (prepared by the analytical laboratory) and one field blank (rinsate of an un-used Teflon bailer) would be collected for each day of sampling. At the end of each day, the samples would either be delivered to the analytical laboratory (Accutest in Dayton, New Jersey; Certification No. 12129), or returned to Sovereign's Robbinsville, New Jersey office where they would be picked up by an Accutest courier the following morning.

The submersible pumps used during groundwater sampling would be decontaminated between each well. The pump and electric cord would first be placed in a bucket with a non-phosphate detergent solution and allowed to operate for several minutes; any sediment on the outside of the pump would also be removed during this stage. The pump would then be transferred to a second bucket containing potable water and allowed to run for several minutes. Finally, the outside of the pump would be rinsed with potable water prior to re-use. Teflon bailers and vinyl tubing would be disposed between well locations and would not need to be decontaminated.

5.0 WELL RECONCILIATION

Item II.3 of the NJDEP's 5 April 2000 letter required that all monitoring well names and locations be reconciled so that historical sampling information and current sampling information could be properly integrated. Following a review of the project files and information from the NJDEP-BWA, EPI has summarized previous and current well names, well permit numbers, State Plane coordinates, well construction details, and the area of concern in which the well is located. This information is presented on Table 1.

6.0 DRUM DISPOSAL

As indicated in the NJDEP's 12 August 2002 NOV letter, approximately 20 drums were present at various locations across the property during the NJDEP's 2 August 2002 site inspection. These drums were subsequently collected by the NJDEP during the October/November 2002 site visit to address the leaking capacitors in AOC-3 (see Section 3.16), and were staged near the construction trailer along with the drums generated during the PCB cleanup efforts (see the memorandum in Appendix A).

During Sovereign's initial site visit on 17 & 18 March 2003, 30 drums were identified as being staged near the former construction trailer. Sovereign uncovered these drums, and was able to determine non-intrusively (i.e., the drums were not opened) that seven of the drums are empty, six of the drums appeared to contain soil, seven of the drums appeared to contain liquid, and three of the drums contained scrap metal (the old capacitors). The contents of the remaining seven drums could not be determined during this site visit. Of the 23 drums that contained material, 15 drums were over-packed, and the drums inside these over-packs were upside down. Many of these over-packed drums also contained free liquid, suggesting that the upside down drums were leaking.

On 2 April 2003, Sovereign and EISCO-NJ opened and collected waste characterization samples from the 23 drums staged near the construction trailer. Due to the minimal volume of material in several of the drums, the waste was able to be consolidated into a total of 18 drums (seven containing liquid and 11 containing solids). The content of each drum was analyzed for the following waste characterization suite of analyses:

- TCLP Volatile Organic Compounds (VOCs)
- TCLP Semi-Volatile Organic Compounds (SVOCs)
- TCLP Metals
- TCLP Pesticides and Herbicides
- Ignitability
- Reactivity
- Corrosivity
- Total Petroleum Hydrocarbons (TPH)
- Polychlorinated Biphenyls (PCBs)

All analytical parameters were below their applicable Maximum Contaminant Levels (MCLs), except as follows:

- PCBs were detected in solids samples S-8 (12,300 ppm), S-9 (14,800 ppm), S-14 (150,000 ppm), S-15 (752 ppm), S-16 (556 ppm), and S-17 (439 ppm) at concentrations exceeding the Toxic Substances Control Act (TSCA) limit of 50.0 ppm.
- Liquid sample S-23 had a flash point of 26°F which is below the MCL of 140°F, making this a characteristically hazardous waste due to ignitability. It is believed that this drum was used to collect separate phase xylene and groundwater from monitoring well I53S in AOC-I.

On 24 June 2003, all of the drums were transported by EISCO-NJ to CycleChem in Elizabeth, New Jersey. From there, the drums were sent to the following disposal facilities:

Contents of Drums	Number of Drums	Disposal Facility
PCB contaminated soil, >500 ppm (55 gallon drums)	3	Chemical Waste Management TSCA, RCRA Hazardous Waste Landfill Model City, New York
PCB contaminated Transformer/Capacitor, >500 ppm (85 gallon over-pack drums)	3	
Non-hazardous soil (85 gallon over-pack drums)	2	Waste Management Sub-title D, Non-hazardous Waste Landfill Morrisville, Pennsylvania
Non-hazardous soil (55 gallon drums)	6*	
Non-hazardous oily water (85 gallon over-pack drums)	6	LORCO Elizabeth, New Jersey
F003, D001, Hazardous liquid (85 gallon over-pack drum)	1	DuPont Wastewater Treatment Plant Deepwater, New Jersey
Notes: * = Total includes three drums of drill cuttings from MW-5, MW-6, and MW-7 that were found in the southern portion of the facility.		

Prior to the drums being removed from the site, EPI re-activated the former EPA ID number for the facility (NJD986603892) by notifying the NJDEP - Hazardous Waste Regulation Program and the USEPA. Copies of the disposal manifests for these drums are included in Appendix B.

7.0 SCHEDULE OF ACTIVITIES

As shown on the attached Schedule of Activities, EPI will begin implementation of this Remedial Investigation Work Plan by December 2003 (assuming NJDEP approval is received by mid-November 2003). It is anticipated that soil and groundwater sampling (excluding the quarterly sampling of MW-5, MW-6, and MW-7) would be completed by mid-April 2004 (weather permitting). The work plan for addressing radiological issues associated with the blended soil pile would be submitted to the NJDEP by the end of August 2003, and would include its own implementation schedules. A Remedial Investigation Report and Remedial Action Work Plan for all other areas of the site would be submitted to the NJDEP by August 2004.

Tables

TABLE 1
INSTRUMENTATION FOR RADIOLOGICAL SURVEYS
FORMER NUODENX CORPORATION FACILITY
INDUSTRIAL AVENUE
FORDS, WOODBRIDGE TWP., NEW JERSEY
ISRA CASE NOS. 85161 & 89475

Type of Measurement	Instrumentation		Number Available	Bkdg. (cpm)	4 pi eff.[1] (%)	Detection Sensitivity
	Detector	Meter				
Surface Activity - beta-gamma	Pancake GM Ludlum Model 44-9	Scaler/Ratemeter[2] Ludlum Model 2221	2	40	18	1,200 dpm/100 cm^2
Surface Activity - beta-gamma	Pancake GM Ludlum Model 44-40	Scaler/Ratemeter[2] Ludlum Model 2221	2	40	18	1,200 dpm/100 cm^2
Surface Scans - beta-gamma	Pancake GM Ludlum Model 44-9	Scaler/Ratemeter[3] Ludlum Model 2221	2	40	18	4,400 dpm/100 cm^2
Surface Scans - beta-gamma	Pancake GM Ludlum Model 44-40	Scaler/Ratemeter[3] Ludlum Model 2221	2	40	18	4,400 dpm/100 cm^2
Surface Scans - gamma	Scintillation FIDLER		1	Note[5]	NA	Note[5]
Surface Scans - gamma	Scintillation Ludlum Model 44-10	Scaler/Ratemeter Ludlum Model 2221	1	7,500	NA	1 micro-R/hr[4]
Exposure Rates	Micro-R Meter Ludlum Model 19	Micro-R Meter Ludlum Model 19	1	NA	NA	1 micro-R/hr

NOTES:

[1]Efficiency determined with NIST traceable Sr-Y^{90} source supplied by Colorado State University.

[2]1 minute integrated count.

[3]Monitoring audible signal.

[4]According to manufacturer's specifications using a Cs-137 source.

[5]To be determined by instrument used.